ORDER

U.S. DEPARTMENT OF TRANSPORTATION
FEDERAL AVIATION ADMINISTRATION

6120.1B

4/6/93

SUBJ: LOCAL MODIFICATIONS FOR ARTS SOFTWARE AND SYSTEM STATUS ACCOUNTING

1. PURPOSE. This order provides procedures for the development and implementation of local enhancements to Automated Radar Terminal System (ARTS) operational and support software. It establishes controls and incorporates procedures for submitting, processing, and using enhancements in the Local Patch Libraries ARTS (LPLA) as directed by national configuration management. For standardization, this order provides direction for the research, design, development, testing, implementation, evaluation, and maintenance of all local modifications. ARTS includes ARTS IIA, ARTS IIIA, and En Route Automated Radar Tracking System (EARTS). The ARTS IIIE program cannot be modified at this time and, therefore, is not included in this order.

2. DISTRIBUTION. This order is distributed to the air traffic branch level in Washington and regional headquarters, the Operational Support Service branch levels and to all ARTS facilities.

3. CANCELLATION. This order cancels Order 6120.1A, Facility Modifications to ARTS IIIA Air Traffic Maintained Software, dated February 10, 1988, and Order 6120.2, Procedures for Field Development of Automation Projects, dated October 7, 1977. It also cancels other previously issued memorandums relating to local modification of National Airspace System (NAS) ARTS air traffic operational and support software.

4. BACKGROUND.

a. ARTS software is centrally developed and maintained in order to ensure conformity throughout the NAS. This concept ensures that each automated facility receives a standard operational program. Configuration management of a national program is necessary for standardization, even though it is recognized that some site flexibility is required.

b. Success of the major near-term and long-term improvements to the NAS is dependent upon strict adherence to configuration management policies. The procedures contained in this order have been developed to configuration manage existing, as well as future, local modification development and implementation in ARTS systems.

c. The local patch library concept has been developed in order to:

(1) Ensure commonality of operational software.
(2) Eliminate duplicate functionality.
(3) Configuration manage local modifications.
(4) Determine national implementation of functions.

5. EXPLANATION OF CHANGES. This order updates procedures for the development and implementation of local enhancements to the ARTS operational and support software. It provides for procedures to be used with the LPLA's once they are established for the ARTS and for interim procedures until they are established.

6. GENERAL PROCEDURES.

a. ARTS facilities shall not implement any new local modifications to ARTS software without the concurrence of the Air Traffic Plans and Requirements Service, ATR-1, Automation Software Policy and Planning Division, ATR-200. The regional Air Traffic Division manager may authorize the development and testing of facility modifications.

b. A case file using FAA Form 1800-2, NAS Change Proposal (NCP), is required to process and approve a local modification to the operational or support software. The narrative documentation in case files shall include the information required by the current edition of Order 1800.8, National Airspace System (NAS) Configuration Management. Field originated case files shall be submitted to the appropriate regional Air Traffic Division. The region will review the case file and screen for duplicates, normally within 30 days and, upon approval, forward the case file to ATR-200 for processing.

c. ATR-200 shall coordinate and obtain approval from the Civil Operations Program, ATM-100, and the Procedures Division, ATP-100, for all case files that have any involvement with air traffic operations or procedures, respectively. This process should normally take place within 60 days.

d. ATR-200 shall forward all local modifications to the National Automation Field Support Division, AOS-400, for review in order to ensure technical accuracy. AOS-400 will analyze, identify, and advise ATR-200 of duplicates. ATR-200, after coordinating with the respective regional Air Traffic Division, will determine which duplicate local modification to delete or modify.

e. Normally within 30 days, ATR-200 will task, through the region, the appropriate facility to perform operational testing on a modification.

f. The procedures contained in Appendix 1, Procedures for Local Modifications, shall be followed when developing a modification. Test plans, procedures, and capacity tests (when feasible) shall be developed that will ensure that the modification executes as expected and ensure there is no degradation of the operational software. Full program documentation, including listings of the program changes, shall be maintained by AOS-400 and those sites using local modifications.

g. Upon completion of the development task and successful testing of the modification at the site, the case file and all associated documentation shall be forwarded to ATR-200. ATR-200 will then forward the package to AOS-400 for review.

h. After completion of a successful review, AOS-400 will notify ATR-200 for processing by the Air Traffic Configuration Control Board (AT CCB). The AT CCB will authorize AOS-400 to enter the modification into the appropriate LPLA.

i. The regions shall keep a status accounting of all ARTS local modifications in the facilities represented by the region.

7. LOCAL PATCH LIBRARY PROCEDURES (ARTS IIA, ARTS IIIA, and EARTS).

a. After AT CCB approval, the modification will be entered into the LPLA. Except for ARTS IIA, AOS-400 shall prove compatibility between all nationally distributed modifications and previously approved local modifications. AOS-400 shall prove compatibility between the modification and the current operational ARTS IIA program at the national patch level. AOS-400 shall maintain a listing of all modifications in the LPLA and will distribute it to the regions and ATR-200. The LPLA's will be maintained by AOS-400, but may request the regions, through ATR-200, to assist with the maintenance.

b. Whenever possible, the LPLA will be resident on the Stand Alone Assembly System (SAAS) located at the FAA Technical Center. Access will be available via use of a personal computer (PC), STEP board, and direct line or modem to authorized users.

c. Whenever possible, an interactive menu will be available to facilitate accessing the LPLA.

d. Regions shall notify ATR-200 in writing when a site requests to use a modification selected from the LPLA. ATR-200 shall notify AOS-400 of the request.

e. Regional Air Traffic Division managers may authorize operational use of a modification after satisfactory completion of off-line testing and system certification. The regions shall notify ATR-200 when they use a modification operationally. The regions shall also notify ATR-200 when they delete a previously approved modification from their system. ATR-200 shall, in turn, provide timely notification to AOS-400.

f. Facilities shall use the procedures specified in Order 1100.145, Program Technical Report (PTR) Procedures, to report a problem with the modification. The PTR will be forwarded to AOS-400 for validation and subsequent assignment to the modification originator, through the appropriate region, for resolution.

g. PTR resolutions shall be forwarded to AOS-400 for inclusion in the LPLA after review and testing. PTR resolutions shall be in the form of source updates to the LPLA. A Site Program Bulletin (SPB) will be distributed to notify the users.

h. A modification will remain in the LPLA until it is determined that it is no longer required. This can occur when either a sufficient number of sites are using the patch and it is sourced according to the latest version of Order 1800.8,

or when ATM-100 determines it is no longer required and requests AOS-400 through ATR-200 to remove it from the LPLA.

i. Modifications in the LPLA considered for sourcing shall go through the NCP process as a national case file and shall be reviewed by the appropriate regional and FAA headquarters organizations.

8. NONELECTRONIC MEDIA MAINTENANCE AND TRANSMITTAL. Some of the procedures in paragraph 6 require the technical and physical capabilities of the SAAS. Until all the LPLA's are resident on the SAAS and all ARTS facilities have equipment to access the SAAS, some data documentation, maintenance, and transmission will be done by AOS-400 in nonelectronic media.

9. AUTOMATION STATUS REPORTING.

a. All ARTS IIIA facilities shall submit, on a quarterly basis, an Automation Status Report as per Appendix 2.

b. The report shall be due on the 15th of the first month in each reporting quarter and forwarded to the Automation Policy Branch, ATR-230, with a copy to the region.

William H. Pollard
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for Air Traffic

APPENDIX 1. PROCEDURES FOR LOCAL MODIFICATIONS

1. Documentation

The following requirements are in addition to the requirements specified in the current edition of Order 1800.8, National Airspace System (NAS) Configuration Management:

a. The descriptive title of the NAS Change Proposal for local program modification should be brief and unique but descriptive of the problem described or the improvement/enhancement requested.

b. The description of the improvement or enhancement requested should be well defined. The description should be in detailed, self-explanatory statements. To preclude the possibility of misinterpretation, if possible, an example should be included. If the case file is being submitted as a result of an invalid (closed or in specification) Program Technical Report (PTR), include the PTR number in the description.

c. The description of change should include the following:

(1) The recommended change should be a thorough and complete document for the local modification and should include all areas which are affected; e.g., display symbology, error and status messages, keyboard format, etc. Excerpts from NAS-MD-Series may be used but should include complete sections. Each area which is affected should be distinguished by a change bar running the length of the change in the outside margin.

(2) All supplementary pages within the detailed description should contain the title, case file number, NAS-MD-Series, and section/subsection which have been affected for reference.

(3) Page 1-1 should contain a master list of the NAS-MD-Series, section, and subsection which are affected. All supplemental pages should be identified sequentially; e.g., 1-2, 1-3, etc.

d. The remarks should include costs (if possible to estimate), documentation, schedules, procedural application, and subprograms which are affected and any additional information relevant to the case file.

2. Testing of Local Program Modifications.

a. Test Plan. The test plan shall consist of defining the functions that are to be tested and the test methods to be employed in verifying that the modification properly accomplishes these functions. This requires stating the coordination/application of test tools, data, methods, and logic in conjunction with the hardware required to achieve the desired results of each function. In addition, the test plan shall specify the methods that will be employed to

guarantee the integrity of the local ARTS system and test for possible degradation of interfaces with adjacent facility systems. The test variations that are selected to accomplish the test plan, along with the expected results of each variation, shall be explicitly defined. The test plan must be documented and shall be included in the proposed modification package.

b. Test Design.

(1) Test data shall be devised to exercise and verify all the variations listed in the test plan. These data variations shall be converted to live and/or simulated test scripts, depending upon the nature of the modification. It is imperative that test scripts be maintained to reflect the variations in use.

(2) Each facility shall maintain, as appropriate, a simulation tape/test script with variations previously used to verify other local or national modifications. The simulation tape/test script shall be updated on a continuing basis in order to ensure compatibility with the current state-of-the-system.

(3) One or more simulated and/or live tests should be generated to verify the functions of the modifications and to test any possible degradation of the interface with adjacent facility systems.

c. Test Conduct.

(1) Testing shall be conducted as a process of verifying functions, finding and correcting errors/discrepancies, and recording the test actions employed. Testing shall be coordinated with local Airway Facilities and other applicable personnel. The testing process shall continue until all functional aspects have been tested and discrepancies have been resolved. This testing does not replace, amend, or supersede any national certification procedures or requirements.

(2) Two levels of testing shall be employed to verify the accuracy and functional impact of proposed modifications. The first level shall be devoted to determining that coding is correct and that all intended functions of the modifications are properly accomplished. It is expected that several iterations of this level would be required to test the various functional circumstances and interactions involved. The second level of testing consists of exercising the total system through system integrity/degradation as a result of implementing the proposed local modification. Development and maintenance of the facility baseline test shall be a field facility responsibility. Wherever possible and applicable, baseline test specifications (ARTS) criteria will be used as the structure of baseline test developments.

(3) Additionally, a test shall be employed to determine the impact of any local modification on displayed data. Particular emphasis shall be given to verification of target locations. Specific checks shall be made to detect any displacement problems that could result in an invalidation of separation

standards. Further checks shall be made to validate track and target correlation in the various possible track mode/radar return combinations.

d. Test Analysis.

(1) Analysis shall be accomplished after each test effort and should be completed before the next step is taken.

(2) The facility baseline test shall be compared against a previous baseline test to determine the integrity of the modified system.

(3) Other required tests shall be analyzed manually or with the use of any available tool or method as deemed appropriate by the facility automation staff.

e. Test Report. The test report contents and formats will depend on the complexity of the modification being tested. The test report shall provide a record of the completion of each test. It shall contain conclusions and recommendations with supporting analysis and data based on the results of the testing. The test report shall be regarded as an integral part of the documentation and shall be completed prior to approval of a local modification for operational use.

3. Formats and Coding Conventions and Policy.

a. ARTS IIIA and EARTS. All modifications shall conform to the Stand Alone Assembly System (SAAS) automated patch procedures for the appropriate system. These procedures are SAAS resident programs accessible via PC, with STEP board and direct line or modem.

b. ARTS IIA. Modifications shall conform to the coding conventions contained in Section 4 of Computer Automation's LSI-2 Series Minicomputer Handbook, 20400-91 (DO), dated October 1980.

c. General Instructions.

(1) Modifications that require the use of available core shall follow a logical flow which begins with a branch to the modification area followed by the instructions to be placed therein.

(2) To the extent feasible, each line shall contain meaningful comments.

(3) Enhancement coding should be designed with processing efficiency as a major consideration. Programs should have minimal impact on processing time and memory utilization. Modification build format should consider implementation at all facilities with minimal modification.

APPENDIX 2 - AUTOMATION STATUS RECORD (ARTS IIIA)

Facility ID	System/Version:	System Update:	Date:
(IAH ATCT)	(ARTS IIIA/A3.04)	Level F	March 15, 1991

Class 1. Approved Modifications Under Development.

Case File Number:

Description: Date:

Class 2. Approved Modifications in the Operational System.

Case File Number:

Description: Date:

Class 3. Approved Modifications Developed by Other Facilities that are in the Operational System.

Case File Number:

Description: Date:

Class 4. Unverified PTR Corrections in Operational System.

PTR Number:

Subprogram: Date:

Class 5. AOS-400 Verified PTR Corrections that are in Operational System.

PTR Number:

Subprogram: Date:

Class 6. Adaptation Data Base and Modifications to the Data Base.

Patch Number:

Table: Date:

Class 7. Automation Outage Report.

List all outages/interruptions to the operational system.

Date Time Duration Cause

Class 8. Equipment Problems.

List all failures of disks/disk control units (DCU), disk drive units (DDU), input/output processors (IOP), memory modules/users, and all peripherals.

Date	Time	Duration	Cause

Class 9. Automation Personnel.

List all automation specialists onboard at the end of the reporting period.